State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Aquatic Resources
Honolulu, Hawaii 96813

June 9, 2006

Board of Land and
Natural Resources
Honolulu, Hawaii

REQUEST FOR AUTHORIZATION/APPROVAL TO ISSUE ONE (1) NORTHWESTERN HAWAIIAN ISLANDS (NWHI) RESEARCH, MONITORING AND EDUCATION PERMIT TO DR. JOHN J. B. ROONEY OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA), PACIFIC ISLAND FISHERIES SCIENCE CENTER (PIFSC) FOR MULTIBEAM SURVEYING FOR BENTHIC HABITAT MAPPING PURPOSES IN THE WATERS SURROUNDING KURE ATOLL AND PEARL AND HERMES ATOLL, VALID FROM JUNE 29, 2006 TO JULY 14, 2006

Submitted herewith for your authorization and approval is a request for issuance of a NWHI Access Permit to Dr. John J. B. Rooney of NOAA, PIFSC. The Research, Monitoring and Education Permit, described below, will allow activity to occur in the NWHI State marine Refuge (0-3 miles) waters surrounding Pearl and Hermes Atoll and Kure Atoll. The activities covered under this permit will occur from June 29, 2006 to July 14, 2006, from the support vessel Hi'ialakai.

The purpose of this work is to provide base layers of bathymetric information (high-resolution bathymetry and acoustic backscatter imagery) that will be used to drive management and research decisions in the NWHI. Mapping of all U.S. coral reefs is the first goal listed by the Coral Reef Conservation Program. A basic understanding of what benthic habitats exist in the NWHI is crucial for state managers to make informed management decisions.

The proposed activities (below) are consistent with and support the purposes of the Refuge, primarily to better understand and manage the resources within the marine refuge.

Surveying will be accomplished using three different multibeam systems. Two systems are housed aboard the Hi'ialakai, and one system is operated from the survey launch R/V Ahi. The Ahi surveys in shallow waters during daylight, and the ship surveys in deeper areas at all hours.

REVIEW PROCESS:

The permit was received by the Division of Aquatic Resources on April 6, 2006. It was sent out for review and comment to the following scientific entities: Division of Aquatic Resources staff (5), Division of Forestry and Wildlife, Northwest Hawaiian Islands Coral Reef Ecosystem Reserve, United States Fish and Wildlife Service. Native Hawaiians from the Office of Hawaiian Affairs, and Kaho'olawe Island Reserve Commission were also consulted.

As of May 30, 2006, the Division of Aquatic Resources has received comments from the Northwest Hawaiian Islands Coral Reef Ecosystem Reserve in support of this application and the issuance of permit. The Reserve also recommends that applicants should be provided with a briefing on the Native Hawaiian cultural significance of the area, and that discharge must be regulated in accordance with Reserve prohibitions when transiting Reserve waters. See Attachment 1 for detail of the Reserve's comments.

No other issues or concerns were raised from the Scientific Community or from Native Hawaiians.

RESPONSE:
No response required.

FINAL STAFF RECOMMENDATIONS:

1) Approve the request for access to State waters in order to map benthic habitat via multibeam surveying techniques.

RECOMMENDATION:

"That the Board authorize and approve, with stated conditions, a Research, Monitoring and Education Permit to Dr. John J. B. Rooney of the National Oceanic and Atmospheric Administration, for activities and access within the State waters of the NWHI."

Respectfully submitted,

DAN POLHEMUS
Administrator

APPROVED FOR SUBMITTAL

PETER T. YOUNG
Chairperson

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve
NOAA/NOS/NMSP
Comments on State of Hawaii NWHI Marine Refuge Permits

PERMIT SUMMARY
Title: Multibeam Mapping
Project Leader: John Rooney
Location: Kure Atoll and Pearl and Hermes Atoll
Description: Multibeam surveying for benthic habitat mapping purposes will be conducted in areas not previously surveyed using high-resolution methods.

BACKGROUND
Mapping of all US coral reefs is the first goal listed by the Coral Reef Conservation Program. The mapping proposed here is a continuation of mapping work that has been conducted since 2003. Priorities for the work have been set in accordance with results of extensive consultation with partner agencies.

MANAGEMENT RELEVANCE TO THE RESERVE
Mapping efforts will provide high-resolution bathymetry and backscatter imagery that is currently not available. These products are necessary management tools that would be useful for both managers and researchers.

POTENTIAL IMPACTS
Minimal to none.

RESERVE RECOMMENDATION
The Reserve supports this research project and recommends issuing the permit as requested.

Specific Recommendations:
- Applicants should be provided with a briefing on the Native Hawaiian cultural significance of the area.
- Discharge must be regulated in accordance with Reserve prohibitions when transiting Reserve waters.

x Approve
O Approve with conditions
O Disapprove

Reserve staff Reviewers:
x Malia Chow, Ph.D.
x Randy Kosaki, Ph.D.
x Moani Pai
x Kekuewa Kikiloi
x Hoku Johnson

Manager's concurrence with staff recommendation

'Aulani Wilhelm, Acting Reserve Manager

Rooney

APPENDIX 1

State of Hawai'i
DLNR
Northwestern Hawaiian Islands State Marine Refuge
Permit Application Form

For Office Use Only
Permit No:
Expiration date:
Date Appl. Received: 4/06/06
Appl. Fee received: N/A
NWHI Permit Review Committee date:
Board Hearing date:
Post to web date:

Type of Permit

☒ I am applying for a **Research, Monitoring & Education** permit. (Complete and mail Application)
- ☒ This application is for a NEW project in the State Marine Refuge.
- ☐ This application is for an ANNUAL RENEWAL of a previously permitted project in the State Marine Refuge.

☐ I am applying for a permit for a **Native Hawaiian** permit. (Complete and mail Application)
- ☐ This application is for a NEW project in the State Marine Refuge.
- ☐ This application is for an ANNUAL RENEWAL of a previously permitted project in the State Marine Refuge.

☐ I am applying for a **Special Activity** permit. (Complete and mail Application)
- ☐ This application is for a NEW project in the State Marine Refuge.
- ☐ This application is for an ANNUAL RENEWAL of a previously permitted project in the State Marine Refuge.

Briefly describe **Special permit** activity:

When will the NWHI activity take place?

☒ **Summer** (May-July of _2006__ (year)
Note: Permit request must be received before February 1st
Specific dates of expedition _062306 - 071906_

☐ **Fall** (August-November) of ____ (year)
Note: Permit request must be received before May 1st
Specific dates of expedition _____

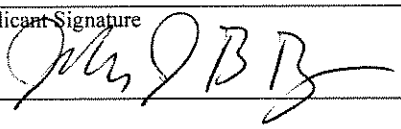
☐ **Other**

NOTE: INCOMPLETE APPLICATIONS WILL NOT BE ACCEPTED

Please Send Permit Applications to:

NWHI State Marine Refuge Permit Coordinator
State of Hawai'i
Department of Land and Natural Resources
Division of Aquatic Resources
1151 Punchbowl Street, Room 330
Honolulu, Hawai'i 96813

NWHI State Marine Refuge Permit Application
See Appendix 2 for Application Instructions

Section A – Applicant Information	
1. Project Leader (attach Project Leader's CV or resume) ☒ CV attached Rooney, John, J.B. Name: Last, First, Middle Initial	Coastal Geomorphologist Title
2. Mailing Address (Street/PO Box, City, State, Zip) Kewalo research Facility 1125B Ala Moana Blvd., Honolulu, HI 96814	Telephone (808) 956-9729 Fax (808) 956-6530 Email Address john.rooney@noaa.gov
3. Affiliation (Institution/Agency/Organization) NOAA Pacific Island Fisheries Science Center	For graduate students, Major Professor 's Name & Telephone NA
4. Sub-Permittee/Assistant Names, Affiliations, and Contact Information ☒ CV or resume attached SEE ATTACHED	
5. Project Title Multibeam Mapping at Kure and Pearl and Hermes Atoll, NWHI	
6. Applicant Signature 	7. Date (mm/dd/yyyy) 06/23/2006

Section B: Project Information

8. **(a) Project Location**

☐ XX NWHI State Marine Refuge (0-3 miles) waters surrounding:

- ☐ Nihoa Island
- ☐ Necker Island (Mokumanamana)
- ☐ French Frigate Shoals
- ☐ Laysan
- ☐ Maro
- ☐ Gardner Pinnacles
- ☐ Lisianski Island, Neva Shoal
- ☒ X Pearl and Hermes Atoll
- ☒ X Kure Atoll, State Wildlife Refuge
- ☐ Other NWHI location

Describe project location (include names, GPS coordinates, habitats, depths and attach maps, etc. as appropriate).

Multibeam surveying for benthic habitat mapping purposes will be conducted in areas not previously surveyed using high-resolution methods, nominally between depths of 20 m and 200 m at Kure and Pearl and Hermes Atolls. See the the attached maps. Education and outreach activities will also occur during the cruise.

(b) check all actions to be authorized:

☐XX Enter the NWHI Marine Refuge waters

☐ Take (harvest) ☐ Possess ☐ Transport (☐ Inter-island ☐ Out-of-state)

☐ Catch ☐ Kill ☐ Disturb ☒ Observe

☐ Anchor ☐ Land (go ashore) ☐ Archaeological research

☐ Interactions with Sea Turtles or Monk Seals ☐ Interactions with Seabirds

☐ Interactions with Live Coral, Ark Shells or Pearl Oysters

☐ Interactions with Jacks, Grouper or Sharks

☐ Conduct Native Hawaiian religious and/or cultural activities

☐XX Other activities _____multibeam surveying, snorkeling and diving by education and outreach personnel_____

(c) Collection of specimens – collecting activities (would apply to any activity):

Organisms or objects (List of species, if applicable, add additional sheets if necessary):

Common name	**Scientific name**	**No. & size of specimens**	**Collection Location(s)**
NONE			

(d) What will be done with the specimens after the project has ended? **NA**

(e) Will the organisms be kept alive after collection? ☐ yes ☐ no NA

- Specific site/location _____
- Is it an open or closed system? ☐ open ☐ closed
- Is there an outfall? ☐ yes ☐ no
- Will these organisms be housed with other organisms? If so, what are the other organisms?

(Please attach additional documentation as needed to complete the questions listed below)

9. Purpose/Need/Scope:

- State purpose of proposed activities: To provide base layers of information (high-resolution bathymetry and acoustic backscatter imagery) that will be used to drive managment and research decisions in the NWHI. Mapping of all US coral reefs is the first goal listed by the Coral Reef Conservation Program. Education and outreach activities will increaase public understanding and appreciation of the NWHI.

Describe how your proposed activities will help provide information or resources to fulfill the State Marine Refuge purpose and to reach the Refuge goals and objectives. Mapping efforts will provide high-resolution bathymetry and backscatter imagery that is currently not available. These products are basic management tools that and would be very useful for both managers and researchers.

- Give reasons why this activity must take place in the NWHI and cannot take place in the Main Hawaiian Islands, or elsewhere. Mapping is required to provide high-resolution data for NWHI areas. Education and outreach activities will help marine educators to better understand, appreciate, and educate others about the NWHI.

- Describe context of this activity, include history of the science for these questions and background. The mapping proposed here is a continuation of mapping work that has been conducted since 2003. Priorities for the work have been set in accordance with results of extensive consultation with partner agencies.

- Explain the need for this activity and how it will help to enhance survival or recovery of refuge wildlife and habitats. High-resolution maps will be very useful tools for management. Education and outreach will help to build public appreciation for the NWHI.

- Describe how your proposed project can help to better manage the State Marine Refuge. The proposed project will assist management efforts by providing needed managment tools- i.e., high-resolution maps.

10. Procedures (include equipment/materials) Surveying will be accomplished using three different multibeam systems, Simrad EM300 and EM3002 systems aboard NOAA Ship Hi'ialakai, and a Reson8101 multibeam system aboard the survey launch R/V Ahi. The Ahi will survey in shallow waters during daylight, while the ship will survey deeper areas at all hours.

11. Funding sources (attach copies budget & funding sources).

Funding is provided to the NOAA Pacific Island Fisheries Science Center by the NOAA Coral Reef Conservation Program.

SEE ATTACHED BUDGET PAGE

12. List all literature cited in this application as well as all other publications relevant to the proposed project.

Pacific Island Moderate Depth Habitat Mapping Implementation Plan, Aug. 2003

13. What types of insurance do you have in place? (attach documentation) **NOAA Ship HI'IALAKAI is a U.S. Government-owned and**

☐XX Wreck Removal and -operated research vessel and is self-insured by the U.S. Government.

☐XX Pollution

14. What certifications/inspections do you have scheduled for your vessel? (attach documentation)

☐XX Rat free ☐ tender vessel ☐ gear/equipment

☐ Hull inspection ☐ ballast water

15. Other permits (list and attach documentation of all other required Federal or State permits). NWHICRER and UFWS permit

SEE ATTACHED

16. Project's relationship to other research projects within the NWHI State Marine Refuge, National Wildlife Refuge, NWHI Coral Reef Ecosystem Reserve, or elsewhere. We are a data provider and make our map products available to any interested user via our website. Additionally, we routinely meet with HI-DLNR, NOAA-NMSP, and other agencies to prioritize our mapping efforts to meet as many of their needs as possible.

Section C: Logistics

17. Time Frame:

Project Start Date 06/23/2006	Project Completion Date 07/19/2006

Dates actively inside the State Marine Refuge. 06/29/2006 - 07/14/2006

Personnel schedule in the State Marine Refuge (describe who will be where and when). Any personnel may be in the State Marine refuge on any particular day, particularly education and outreach personnel, the maritime archaeology team, or mapping personnel on the R/V Ah.

18. Gear and Materials

☐ Dive equipment ☐ Radio Isotopes

☐ Collecting Equipment ☒ Chemicals (specify types) Diesel fuel, lubricating oil, and a host of other products typically required to operate a ship at sea will be carried.

19. Fixed installations and instrumentation.

☐ Transect markers ☐ Acoustic receivers NONE

☐ Other (specify)

20. Provide a time line for sample analysis, data analysis, write-up and publication of information. Bathymetric grids will be publically available for download from the PIBHMC website within 6 months following the cruise.

21. **Vessel Information**:

Vessel Name NOAA Ship HI`IALAKAI IMO Number __8835619_____

Vessel Owner U.S. Dept. of Commerce, NOAA Flag ___USA_____

Captain's Name __CRD Scott Kuester, NOAA Chief Scientist or Project Leader _John Rooney

Vessel Type _Oceanographic Research___ Call sign ___WTEY_____

Length ___224 FT_____ Gross tonnage ___1,914_____

Port of Embarkation _Honolulu____

Last port vessel will have been at prior to this embarkation __Honolulu_____

Total Ballast Water Capacity: Volume __487_____m3 Total number of tanks on ship __10_____

Total Fuel Capacity: _228,642 U.S. gal_____ Total number of fuel tanks on ship _15____

Other fuel/chemicals to be carried on board and amounts: gasoline - as much as 700 U.S. gal.; lube oil - as much as 10,442 U.S. gal.; numerous other industrial and household chemicals used to operate a 224-foot research vessel

Number of tenders/skiffs aboard and specific type of motors SEE ATTACHED

:

Does the vessel have the capability to hold sewage and grey-water? Describe in detail. SEE ATTACHED

Does the vessel have a night-time light protocol for use in the NWHI? Describe in detail (attach additional pages as necessary)

Normally the NOAA Ship Hi'ialakai has navigation lights on 24-hours/day. Work lights at used night when conducting CTD operations.

On what workboats (tenders) will personnel, gear and materials be transported within the State Marine Refuge?

Any of the boats listed for qestion #21 above might be used.

How will personnel, gear and materials be transported between ship and shore?

NA

If applicable, how will personnel be transported between islands within any one atoll?

Any of the boats listed for qestion #21 above might be used to transport personnel within an atoll.

4. Sub-Permittee/Assistant Names, Affiliations, and Contact Information (CVs or resumes attached)

MAPPING
Emily Lundblad, NOAA-JIMAR, Emily.Lundblad@noaa.gov
Jonathan Weiss, NOAA-JIMAR, Jonathan.Weiss@noaa.gov
Joe Chojnacki, NOAA-JIMAR, Joe.Chojnacki@noaa.gov
Louise Giuseffi, NOAA-JIMAR, giuseffi@hawaii.edu
Kyle Hogrefe, NOAA-JIMAR, Kyle.Hogrefe@noaa.gov
Francis Lichowski, UH-G&G, francesl@soest.hawaii.edu
Akel Sterling, UH-HMRG, akel@soest.hawaii.edu
Susan Vogt, NOAA-NMSP, Susan.Vogt@NOAA.gov
TBD
TBD

EUCATION AND OUTREACH
Claire Johnson, NOAA-NMSP, Claire.Johnson@noaa.gov
TBD
TBD
TBD
TBD

15. Certifications/inspections scheduled for your vessel.

- Rat Free (scheduled with U.S. Dept. of Health and Human Services for April 2006)
- Hull Inspection (scheduled with Hawaii Institute of Marine Biology phycologists (normally Scott Godwin) prior to projects working in the Northwestern Hawaiian Islands (NWHI)) to ensure no nuisance algae species are transported to the NWHI.
- Ballast Water (information is transmitted to USCG as required by CFR Title 33, Vol. 2, Parts 151.1500 to 199; IMO Resolution A.868(20); and USCG COMDTPUB P16700.4).

15. Other required State and Federal permits.

Applications for NWHICRER and USFWS permits are attached.

21. Number of tenders/skiffs aboard NOAA Ship Hi'ialakai and specific type of motors onboard:

1 each 10 m AMBAR Marine jet boat with Yanmar 370-hp, Diesel inboard engine
1 each 8 m AMBAR Marine jet boat with Yanmar 315-hp, Diesel inboard engine
2 each 17.5 ft Zodiac inflatable boats, each with one Honda
50-hp, 4-stroke, outboard gasoline engine
1 each 19 ft AMBAR Marine rescue boat with Honda 115-hp, 4-stroke, outboard gasoline engine
1 each 8 m Safeboat with Volvo Penta 230-hp Diesel inboard/outboard drive

21. Does the vessel have the capability to hold sewage and grey-water? Describe in detail.

The ship has a 4,000 U.S. gal Collection Holding Tank for sewage and grey water. In those waters where effluent may NOT be discharged, sewage and grey

water are held in this tank until the ship is in waters where sewage and grey water may be discharged. The ship has a U.S. Coast Guard-approved Marine Sanitation Device (Omnipure model MSD 12 MC) which is used to treat sewage and grey water in those waters where effluent may be discharged.

NOAA Coral Reef Conservation Program - Internal

FY 2006

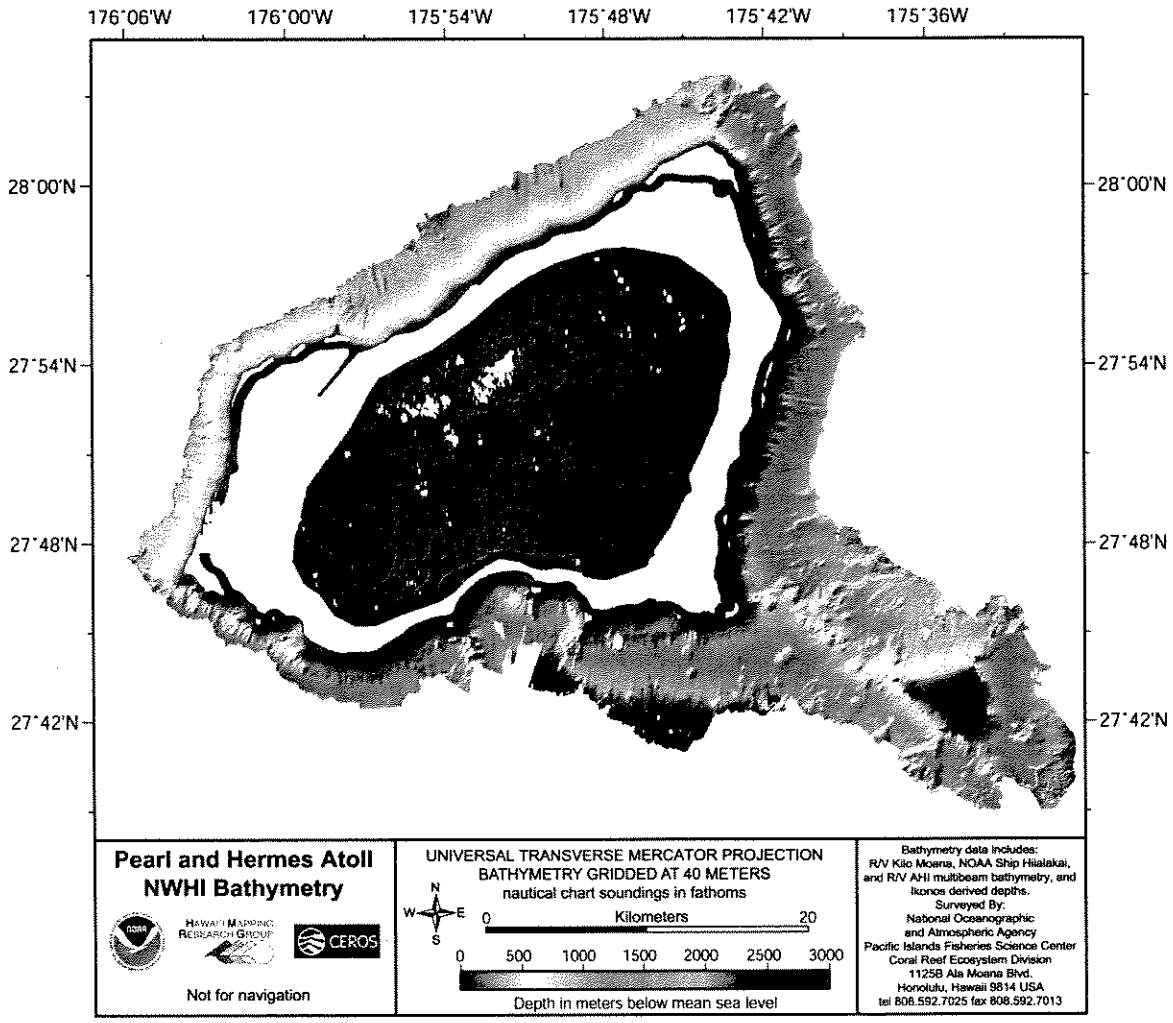
2033

Benthic Habitat Mapping and Characterization - Northwestern and Main Hawaiian Islands

BUDGET: CRCP EXPENDITURES

NOAA Coral Reef Conservation Program Expenditure Summary Report:

Expenditure Type:	Type Other Specified:	Organization Type:	Organization Name:	Amount:	Details:
Federal Travel				$5,053.00	
Contract Travel				$9,588.00	
Other	shipping, postage, binding, publication, forms, aircraft charters			$19,176.00	
Equipment				$53,692.00	
Non-Labor Contracts				$84,504.00	
Contract Labor		Academia	University of Hawaii	$400,000.00	
Federal Labor				$65,594.00	
Supplies				$52,733.00	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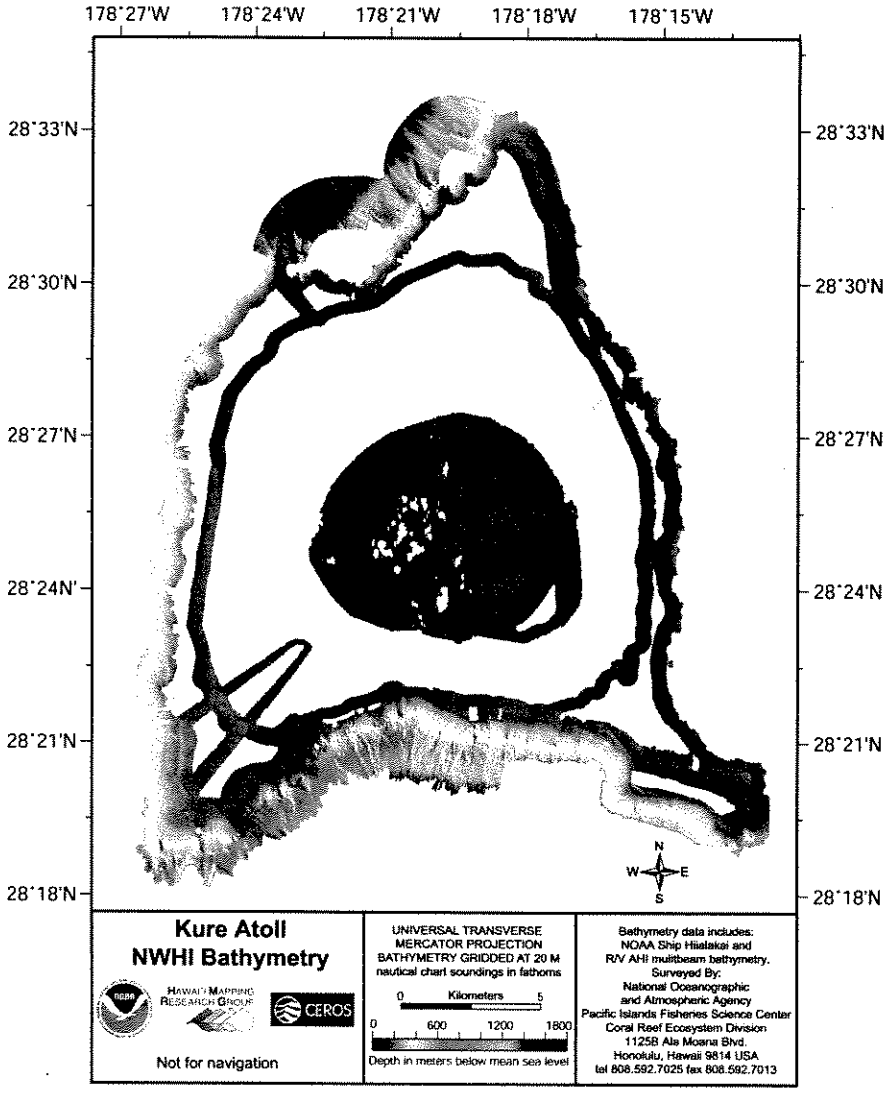
176°00'W
175°54'W
175°48'W
175°42'W
175°36W
28°00'N
27°54'N
27°48'N
27°42'N
Pearl and Hermes Atoll
NWHI Bathymetry
Hawai'i Mapping Research Group
CEROS
Not for navigation
UNIVERSAL TRANSVERSE MERCATOR PROJECTION
BATHYMETRY GRIDDED AT 40 METERS
nautical chart soundings in fathoms
N
W
E
S
0
Kilometers
20
0
500
1000
1500
2000
2500
3000
Depth in meters below mean sea level
Bathymetry data includes:
R/V Kilo Moana, NOAA Ship Hiialakai,
and R/V AHI multibeam bathymetry, and
Ikonos derived depths.
Surveyed By:
National Oceanographic
and Atmospheric Agency
Pacific Islands Fisheries Science Center
Coral Reef Ecosystem Division
1125B Ala Moana Blvd.
Honolulu, Hawaii 9814 USA
tel 808.592.7025 fax 808.592.7013



Kure Atoll
NWHI Bathymetry

HAWAI'I MAPPING RESEARCH GROUP

CEROS

Not for navigation

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
BATHYMETRY GRIDDED AT 20 M
nautical chart soundings in fathoms

0 Kilometers 5

0 600 1200 1800

Depth in meters below mean sea level

Bathymetry data includes:
NOAA Ship Hiialakai and
R/V AHI multibeam bathymetry.
Surveyed By:
National Oceanographic
and Atmospheric Agency
Pacific Islands Fisheries Science Center
Coral Reef Ecosystem Division
1125B Ala Moana Blvd.
Honolulu, Hawaii 9814 USA
tel 808.592.7025 fax 808.592.7013

CURRICULUM VITAE

JOHN J. B. ROONEY
Coastal Geomorphologist
Joint Institute for Marine and Atmospheric Research
NOAA Pacific Islands Fisheries Science Center
Kewalo Research Facility, 1125-B Ala Moana Blvd., Honolulu, HI 96814
John.Rooney@NOAA.gov, (p) 808-592-8303, (f) 808-592-7013

EDUCATION

Ph.D.	Coastal Geology	University of Hawaii	2002
M.S.	Oceanography	University of Hawaii	1995
B.S.	Geology	Tulane University	1982

POSITIONS HELD

2003 – present	Coastal Geomorphologist, NOAA Pacific Islands Fisheries Science Center
2002	Postdoctoral Researcher, Department of Geology and Geophysics, University of Hawaii
1996 – 2001	Research Assistant, Department of Geology and Geophysics, University of Hawaii
1992 – 1995	Research Assistant, Department of Oceanography, University of Hawaii
1986 – 1991	Scuba Diving Instructor, Honolulu, Hawaii
1982 – 1986	Surface Warfare Officer, U.S. Navy

RECENT COMMUNITY AND PROFESSIONAL SERVICE

2004 – present Adjunct Faculty, University of Hawaii, Department of Geology and Geophysics

Graduate Student Committees

Ayesha Genz – graduated Summer 2005, MS, Coastal Geology, University of Hawaii
Chris Conger – Defended MS thesis, Coastal Geology, University of Hawaii, August 2005
Erin Diura – MS candidate, Department of Geology and Geophysics, University of Hawaii

SELECTED PUBLICATIONS

Rooney, J., *Benthic Habitat Mapping to Meet management Needs: A Case Study from Saipan, CNMI.* American Geophysical Union 2006 Ocean Sciences Meeting. Honolulu, Hawaii, Feb. 20-24, 2006.

Chojanacki, J., Rooney, J., and Ferguson, S. *The Influence Of Wave Energy On Spatial Variation In Coral Reef Morphology: Midway Atoll.* American Geophysical Union 2006 Ocean Sciences Meeting. Honolulu, Hawaii, Feb. 20-24, 2006.

Rooney, J. M. Parke, E. Lundblad, J. Chojnacki, S. Holst, J. Miller, J. Laughlin, 2005. *Final Report: Characterization of Benthic Habitat for Saipan Anchorage, Commonwealth of the Norther Mariana Islands.* Prepared for Military sealift Command, U.S. Department of the Navy, May 2005, 41 p.

Rooney, J.J., and C.H. Fletcher, 2005. Shoreline change and Pacific climatic oscillations in Kihei, Maui, Hawaii. *Journal of Coastal Research,* 21(3), 535-547.

Rooney, J., Fletcher, C., Engels, M., Grossman, E. and Field, M., 2004. El Niño Control of Holocene Reef Accretion in Hawaii. *Pacific Science,* 58(2), 305-324.

Engels, M, Fletcher, C, Field, M, Storlazzi, C, Grossman, E, Rooney, J, Conger, C., 2004. Holocene reef accretion: Southwest Molokai, Hawaii. *Journal of Sedimentary Research,* 74(2), 255-269.

Chojnacki, J., J. Rooney, J. Miller, and R. Brainard. *Construction of Benthic Substrate Prediction Maps Using Topology, Rugosity, and Acoustic Signatures at French Frigate Shoals, NWHI.* Third Scientific Symposium on Resource Investigations in the Northwestern Hawaiian Islands, Honolulu, HI, Nov. 2 – 4, 2004.

Rooney, J., J. Miller, F. Parrish, and M. Parke. *A Classification Scheme for Benthic Habitat Mapping in the Northwestern Hawaiian Islands.* Third Scientific Symposium on Resource Investigations in the Northwestern Hawaiian Islands, Honolulu, HI, Nov. 2 – 4, 2004.

Rooney, J., Miller, J., Ferguson, S., Chojnacki, J., Moews, M., Applegate, B., Parke, M., and Brainard, R., *Characterization of Pacific Island Benthic Habitats – Putting the Pieces Together*. American Geophysical Union 2004 Western Geophysics Meeting. Honolulu, Hawaii, August 16 - 20, 2004.

Rooney, J., C. Fletcher, M. Engels, E. Grossman and M. Field, *Variability of Hawaiian Reef Accretion and El Niño over the Holocene Epoch.* Tenth International Coral Reef Symposium, Okinawa, Japan, Jun 28 – July 2, 2004.

Rooney, J., J. Miller, S. Ferguson, R. Brainard, B. Appelgate and M. Monaco, *Benthic Habitat Mapping at U.S.-Interest Pacific Islands.* Tenth International Coral Reef Symposium, Okinawa, Japan, Jun 28 – July 2, 2004.

Rooney, J.J., C.H. Fletcher, and M. Barbee, 2001. Kihei, Maui, *Hawaii Shoreline Change Poster Series*. Published under Contract No. G0605 for the Maui County Planning Department.

Rooney, J.J. and S.V. Smith, 1999. Watershed Landuse and Bay Sedimentation. *Journal of Coastal Research*, 15(2), 478-485.

Hearn, C.J., J.L. Largier, S.V. Smith, J. Plant, and J.J. Rooney, 1996. Effects of changing bathymetry on the summer buoyancy dynamics of a shallow mediterranean estuary; Tomales Bay, California. In: D.G. Aubrey and C.T. Friedrichs, (eds.) *Coastal and Estuarine Studies, Vol 53, Buoyancy Effects on Coastal and Estuarine Dynamics*. Geophysical Monographs, American Geophysical Union, pp. 243-253.

Rooney, J.J., 1996. Impact of the Magnuson Fisheries Conservation and Management Act on fisheries in the U.S. Exclusive Economic Zone. In Borgese, E.M, N. Ginsburg, and J.R. Morgan, (eds.) *The Ocean Yearbook, 1996, Vol. 12*. Chicago and London: The University of Chicago Press, pp. 92-108.

AWARDS

2000	Achievement Rewards for College Scientists (ARCS) ($5,000.)
1998	William T. Coulbourn Fellowship, ($1,500.)

LICENSES HELD

US Merchant Marine 50 Ton Master's License with Sail Endorsement

International Association of Nitrox and Technical Divers/ Technical Divers International - Nitrox and Advanced Nitrox Instructor, Advanced Deep Air, Technical Nitrox, Trimix, Trimix Instructor, Mk XV Series Mixed Gas Rebreather Supervisor

JOSEPH DOWNES CHOJNACKI

E-Mail: Joe.Chojnacki@noaa.gov Phone: (808) 956-2698
NMFS - Pacific Islands Benthic Habitat Mapping Center,
Kewalo Research Facility, 1125B Ala Moana Boulevard, Honolulu, HI 96814

EDUCATION

University of Hawaii – Manoa, Honolulu, HI, USA

M.A. in Geography: September 2003 – Present. Anticipated completion: May 2006

My thesis investigates the correlation between spatial variability in reef morphology and variable wave energy around Midway Atoll. Geostatistical comparison of modeled wave data with measurements of reef features from multibeam bathymetry, with the aim of deriving a governing equation for spur & groove formation.

Coursework included: Geospatial Analysis, Geomorphology, Corals & Coral Reefs, Remote Sensing, Advanced Cartography, Spatial Ecology, Programming for ArcGIS, and Biometry

SKILLS ACQUIRED: Expertise in ArcGIS 9.x, geostatistical analysis, classical statistics, programming skills, and cartographic skills such as raster data editing, georectification, image mosaicking, photo draping.

Lewis & Clark College, Portland, OR, USA

B.A. in Biology: Awarded May, 1999

Emphasis in Marine Ecology. Developed underwater field survey skills on coral reefs in the Caribbean; observational and experimental studies; microbiology, chemistry, and physics laboratory work; and statistical analysis.

RESEARCH STRENGTHS

- *ESRI ArcGIS 9.x*: Demonstrated expertise in: image analysis, clipping multiband imagery, raster data manipulation, generating map plots from tabular data, georeferencing and hyperlinking of photo and video data, management of multiple data layers, transporting and distributing ArcGIS projects and associated files, and production of publication-ready maps.
- *Geomorphology*: Currently completing a master's degree in Geography, with a research emphasis on geomorphology. Extensive experience surveying hundreds of kilometers of coral reefs in the Northwest Hawaiian Islands, American Samoa, and the Line and Phoenix Islands. Experience in acoustic mapping and interpretation of submarine features.
- *Statistics*: Training in both classical statistics and geospatial statistics. Skilled in precise application of geostatistical functions in ArcGIS, including: kriging/ interpolation, neighborhood analysis, and automatic feature detection.
- *Field operations*: Participated in planning and operations aspects of 10 research cruises in the remote locations of the NWHI, American Samoa, and the Line & Phoenix Islands. Extensive time working aboard ships, including a 96-day cruise in near-isolation. Experience working with cranes, handling lines, assisting with launch and recovery of small boats. Proven ability to participate in and direct intensive diving

Data Structuring & Archiving: Partnered with colleagues to build framework for archiving data on CRED common drive. Took a collection of disparate file directories and integrated them into a single, commonly available data structure for all of CRED.

Cruise Planning & Support: Carried out all preparation for Midway Dec2002 survey; led Towboard team on NWHI 2003 cruise, led mooring team on NWHI 2005 cruise; participated in planning, preparation and operations on a total of 10 research cruises.

Data Processing & Development: Developed data collecting methodology for CRED Towboard data and streamlined data processing to meet analysis objectives. Standardized process to download GPS data to computer and enter observer data sheets into database.

RELATED MARINE RESEARCH

National Marine Fisheries Service, Honolulu, HI, USA

(Coral Reef Ecosystem Division, contracted separately by the Joint Institute for Marine and Atmospheric Research and Aquatic Farms)

Marine Debris Specialist/ Fisheries Biologist: June 2001- September 2003

Salary: $2,567 per month at 40 hours per week

Participated in several of CRED's ongoing multidisciplinary Reef Assessment and Monitoring Program survey cruises in U.S. Pacific waters, including TC0201 (Equator; 64 days), TC0207 (NWHI; 30 days), OES0306 (NWHI; 37 days). Conducted fish Towboard surveys in the Line and Phoenix Islands and American Samoa and conducted benthic Towboard surveys in the Northwest Hawaiian Islands using underwater videography and underwater data entry. Required knowledge of fish and coral taxonomy (both Hawaiian and Indo-Pacific) and estimating abundances, as well as scuba diving up to three times daily. Included cruise preparation such as procurement of research equipment and supplies, construction of research equipment, small boat maintenance, production of maps for cruise operations, and ship loading. Also organized logistics and managed Towboard data for a 6-day emergency coral bleaching assessment mission to Midway Atoll.

Deployed dozens of oceanographic buoys throughout the U.S. Pacific while on scuba using anchors, liftbags, and hardware. Made extensive use of GPS receivers; used ArcView to manage, process, and plot GPS data. Coordinated closely with the research vessel, working around a crane, handling lines and tying knots, and operating small boats in a variety of environments.

Helped plan and conduct NOAA's first full-scale habitat restoration effort in the Northwestern Hawaiian Islands. Participated in habitat restoration effort in the Northwestern Hawaiian Islands for three years (2001 – 96 days; 2002 – 38 days; 2004 – 22 days) using snorkeling, freediving, and scuba. Located, removed, and analyzed derelict fishing gear on coral reefs; and used GPS and Arcview/GIS to plot and analyze debris accretion patterns. Conducted underwater Towboard surveys, routinely operated small boats, worked around cranes, and documented operations with underwater videography and photography.

Conducted training of personnel for field operations, including: wilderness medicine; small boat handling; scientific diving; GPS; Arcview/GIS, Excel and MS-DOS programs; and boat maintenance and repair.

research schedule, diving up to 3 times daily performing Towboard surveys and mooring deployments underwater. Extensive freediving experience. Proven expertise in small boat handling, including: launch/recovery from ship, operating in large swells, operation in extremely tight quarters around coral reefs, and successful surf zone rescues.

- *Data management*: Extensive experience managing multiple large data sets for use in ArcGIS; participated in the design of two major data structures; experience developing and automating new data processing procedures by writing custom scripts and creating macros.

CURRENT POSITION

Pacific Islands Benthic Habitat Mapping Center, NMFS, Honolulu, HI, USA

Graduate Research Assistant, September 2003 – Present

Salary: $1,650 per month at 20 hours per week

Participated in three PIBHMC mapping cruises in the NWHI: HI0501 (Nihoa, Necker, FFS; 20 days), HI0504 (Ni'ihau, Penguin Bank, Molokai; 14 days), HI0508 (Maro; 21 days).

Developed PIBHMC's Benthic Habitat Classification scheme by partnering with multi-agency collaborators.

Processed large multibeam and singlebeam echosound datasets and performed analysis of submarine features to produce new maps of habitat zones.

Operated multibeam acquisition software for shallow-water bathymetric mapping, and managed and edited large bathymetric datasets.

Drove and operated R/V AHI, a small mapping vessel, including launch and recovery from ships in a variety of conditions.

Independently managed large data sets with multi-source data stream. Created data management structure and data processing protocols. Organized, facilitated access to, and improved data security of all camera sled data, including photos, video data, and navigation data.

Developed scripts and macros to automate processing and analysis of large data sets.

Fostered relationship between Coral Reef Ecosystem Division (CRED) and Palmyra Consortium by coordinating with CRED principal investigators to provide species lists, and by coordinating with NOAA's Unit Diving Supervisor for the Pacific Region to advise the Palmyra Consortium on diving operations.

Developed operational procedures for Trackpoint II underwater tracking system on board NOAA Ship Hi'ialakai and wrote instruction manual.

Led the initiative to complete backlog of CRED cruise reports. Produced a critical reference document summarizing all CRED cruises for internal use and centralized storage of cruise documentation.

PREVIOUS MAPPING WORK & FIELD OPERATIONS

Shallow Reef Drifters: Engineered drifter drogues to map surface currents in the lagoons of the NWHI atolls. Trained assistants to operate buoy in the field.

Maintained and repaired small boats, outboard motors, and SCUBA compressors as needed in the field.

School for Field Studies, Turks & Caicos Islands, British West Indies
Research Technician/ Student: Spring 1997
Studied Caribbean marine ecosystems through one semester of intensive field work. Worked on several research projects using methods such as Towboard, point intercept transect, and stationary fish count. Constructed and deployed larval collector.
Developed and implemented a three-month baseline stock assessment of targeted finfisheries species. Learned identify Eastern Caribbean invertebrates, fishes, corals and macroalgae.

Bellairs Research Institute, Barbados, West Indies
Field Assistant: May 1998- August 1998
Studied and protected sea turtles under Bellairs Research Institute's Turtle Project. Collected accurate data while multi-tasking in the field.
Developed a new turtle-tagging program to enable local dive companies to identify and participate in turtle monitoring.
Gave clear, detailed presentations about turtle life history and conservation to a wide range of audiences.

Douglas County Forestry Department, Solon Springs, WI, USA
Forester's Assistant: September 2000- February 2001
Used aerial photo interpretation to determine spatial distribution of forest types.
Used GPS to delineate borders within forests; interfaced multiple layers of data through ArcView's GIS.
Aided foresters in forest assessment and management for sustainable logging.

FIELD SKILLS/CERTIFICATIONS:
- NOAA Working Diver/ Scientific Diver/ Nitrox Diver: included training in deep diving, liftbag operation, drysuit use, AGA-mask use, ship husbandry, navigation, low-visibility, cold water and pneumatic tool use. Have done dozens of Towboard dives and mooring installations. Also a certified NAUI Master Diver and Nitrox Diver.
- Medically cleared by NOAA for diving.
- NOAA-certified Advanced Coxswain. Extensive experience handling small boats in high surf zones in remote locations, including rescue of capsized colleagues in 15-20' winter swell in NWHI, as well as two other surf-zone rescues.
- Wilderness Medical Associates Wilderness First Responder. Administered an IV to a patient in the field and oversaw evacuation. Was designated team medic for the 2001 and 2002 remote field seasons. Organized medical training for program staff.
- Extensive experience in underwater videography & photography, both *in situ* and remotely via underwater sled.
- Experience loading, trailering, transporting, and launching small boats.
- Valid State of Hawaii Driver's License.
- Certified in Standards of Training, Certification and Watchkeeping (STCW)

- Current First Aid/CPR certification.
- DAN Oxygen Administrator.
- Swiftwater Rescuer. Thorough knowledge of water safety and river rescue systems.
- Completed MGI International Marine Safety training course.
- Ability to work long hours in remote locations aboard ships.

LEADERSHIP ROLES:

- Served as team leader for both CRED Towboard and mooring operations, as well as divemaster for a research cruise.
- Led project to build and deploy surface current drifter buoys in NWHI.
- Coordinated redesign of Towboard benthic data collection and processing protocols.
- Oversaw research assistants in marine ecology case studies.

COMPUTER SKILLS:

- Expertise in ArcView 3.x and ArcGIS 9.x: ability to integrate GPS data into Arc projects, analyze data using queries, hyperlink map features to photos, manipulate raster data sets, use Model Builder to create custom functions, create stand-alone projects for distribution, and produce maps for publication
- Basic knowledge of Python programming language
- Proficiency in Microsoft Excel (including use of macros to automate routines) and MiniTab (statistics)
- Photo and video editing software (ACDSee, Photo Shop, Paint Shop Pro, Roxio Easy Media Creator 7)
- Office productivity tools: Microsoft Word, PowerPoint

PRESENTATIONS/ OUTREACH:

- **Using Towboard Surveys as a Meso-scale Research Tool in Shallow Marine Ecosystems**. 2002. Oral presentation to NOAA and USFWS personnel at the Kachemak Bay Research Reserve, Homer, AK
- **GPS Use by NMFS in Reef Assessment Operations**. 2004. Oral presentation to Oahu GPS Users' Group Meeting.
- **The Impacts of Marine Debris in the Northwest Hawaiian Islands**. 2004. Oral presentation to students at La Pietra school.
- **Chojnacki, J., Rooney, J., and Ferguson, S.** (2006) The Influence of Wave Energy on Spatial Variation in Coral Reef Morphology: Midway Atoll. Pending Poster Presentation. AGU Ocean Sciences February 2006.

PUBLICATIONS:

Rooney, J., J. Miller, S. Ferguson, J. Chojnacki, E. Lundblad, M. Moews, B. Applegate, M. Parke, and R. Brainard (2005) A Preliminary Assessment of the Coral Reef Habitats around Saipan. Contract report for the U.S. Navy

Kenyon J.C., G.S. Aeby, R.E. Brainard, J.D. Chojnacki, M.J. Dunlap, C.B. Wilkinson (2004) Mass coral bleaching on high-latitude reefs in the Hawaiian Archipelago. In Press. *Proceedings of the 10th International Coral Reef Symposium*, Okinawa, Japan, June 28-July 2, 2004

Rooney, J., J. Miller, S. Ferguson, J. Chojnacki, M. Moews, B. Applegate, M. Parke, and R. Brainard (2004) Characterization of Pacific Island Benthic Habitats – Putting the Pieces Together. In Abstract. American Geophysical Union 2004 Western Geophysics Meeting. Honolulu, Hawaii, August, 2004.

Brainard, R., G. Aeby, J. Chojnacki, E. DeMartini, M. Dunlap, S. Ferguson, J. Firing, A. Friedlander, S. Godwin, J. Gove, R. Hoeke, S. Holzwarth, R. Kosaki, E. Keenan, J. Kenyon, M. Lammers, J. Maragos, J. Miller, K. Page, J. Rooney, M. Timmers, P. Vroom, C. Wilkinson, K. Wong, and B. Zgliczynski (2004) Ecosystem science to support ecosystem-based management of the Northwestern Hawaiian Islands. In Abstract. *Third Scientific Symposium on Resource Investigations in the Northwestern Hawaiian Islands*. Honolulu, HI, November 2004. Presentation abstracts, p. 67

Chojnacki, J., J. Rooney, J. Miller, and R. Brainard (2004) Construction of Benthic Substrate Prediction Maps Using Topology, Rugosity, and Acoustic Signatures at French Frigate Shoals, NWHI. Poster Presentation. In Abstract. *Third Scientific Symposium on Resource Investigations in the Northwestern Hawaiian Islands*, Honolulu, HI, November 2004

REFERENCES

Dr. Rusty Brainard, Division Chief
NOAA Fisheries, Pacific Islands Fisheries Science Center, Coral Reef Ecosystem Division
Mailing Address: Coral Reef Ecosystem Division, 1125B Ala Moana Blvd. Honolulu, HI 96814
Phone: (808) 592-7012
E-mail: rusty.brainard@noaa.gov

Scott Ferguson, Principal Investigator & Managing Engineer
NOAA Fisheries, Pacific Islands Fisheries Science Center, Coral Reef Ecosystem Division, Pacific Islands Benthic Habitat Mapping Center
Mailing Address: Coral Reef Ecosystem Division, 1125B Ala Moana Blvd. Honolulu, HI 96814
Phone: (808) 592-8303
E-mail: scott.ferguson@noaa.gov

Dr. Jim Maragos, Coral Biologist - US Fish & Wildlife Service
Mailing Address: c/o Pacific Remote Islands NWR Complex 300 Ala Moana Blvd, Box 50167 Honolulu, HI 96850-5000
Phone: (808) 792-9557
E-mail: jim_maragos@fws.gov

Pacific Remote Islands National Wildlife Refuge
Special Use Permit Application

Please Send Special Use Permit Applications to:

Special Use Permit Coordinator
Pacific Remote Islands National Wildlife Refuge Complex
P.O. Box 50167
300 Ala Moana Blvd, Rm 5-231
Honolulu, HI 96850
808-792-9550

Type of Special Use

☒ I am applying for a **Research** permit. (Complete and mail Application A)
- ☒ This application is for a NEW project on the National Wildlife Refuge(s).
- ☐ This application is for an ANNUAL RENEWAL of a previously permitted project on the National Wildlife Refuge(s). Previous permit number .

☐ I am applying for a **Monitoring** permit. (Complete and mail Application A)
- ☐ This application is for a NEW project on the National Wildlife Refuge(s).
- ☐ This application is for an ANNUAL RENEWAL of a previously permitted project on the National Wildlife Refuge(s) (including Permanent or Semi-permanent installations). Previous permit number .

☐ I am applying for a permit for a **Vessel** to be used as a support platform for other permitted activities on the National Wildlife Refuge(s). (Complete and mail Application A)
- ☐ This application is for a NEW project on the National Wildlife Refuge(s).
- ☐ This application is for an ANNUAL RENEWAL of a previously permitted project on the National Wildlife Refuge(s). Previous permit number .

Application A: Research and/or Monitoring

See Appendix 1 for Application Instructions

Section A – Applicant Information

1. Principal Investigator (attach Principal Investigator's CV) ☒ CV attached Rooney, John, J. B. Name: Last, First, Middle Initial	 Coastal Geomorphologist Title
2. Mailing Address (Street/PO Box, City, State, Zip) Kewalo Research Facility 1125B Ala Moana Blvd. Honolulu, HI 96814	Telephone (808)956-9729 Fax (808)956-6530 Email Address John.Rooney@NOAA.gov
3. Affiliation (Institution/Agency/Organization) NOAA Pacific Island Fisheries Science Center and Univ. of Hawaii, Joint Institute for Marine and Atmospheric Research	For graduate students, Major Professor Name Affiliation & Telephone NA
4. Sub-Permittee/Assistant Names, Affiliations, and Contact Information ☒ CV attached SEE ATTACHED	
5. Project Title Multibeam mapping at Kure and Pearl and Hermes Atolls, NWHI	
6. Applicant Signature John J B Rooney	7. Date (mm/dd/yyyy) 06/29/2006

Section B: Project Information

8. Project Location

- ☒ Hawaiian Islands National Wildlife Refuge
  - ☐ Nihoa Island and surrounding Refuge waters
  - ☐ Necker Island (Mokumanamana) and surrounding Refuge waters
  - ☐ Maro Reef
  - ☐ French Frigate Shoal
  - ☐ Gardner Pinnacles and surrounding Refuge waters
  - ☐ Laysan Island and surrounding Refuge waters
  - ☐ Lisianski Island, Neva Shoal
  - ☒ Pearl and Hermes Atoll
- ☐ Palmyra Atoll National Wildlife Refuge, including Refuge waters
- ☐ Kingman Reef National Wildlife Refuge, including Refuge waters
- ☐ Johnston Island National Wildlife Refuge
- ☐ Howland Island National Wildlife Refuge, including Refuge waters
- ☐ Baker Island National Wildlife Refuge, including Refuge waters
- ☐ Jarvis Island National Wildlife Refuge, including Refuge waters
- ☐ Rose Atoll National Wildlife Refuge, including Refuge waters

Describe project location (include names, GPS coordinates, attach maps, etc. as appropriate).

Multibeam surveying will occur in any areas not previously mapped between depths of 20 m and 200 m at Kure and Pearl and Heremes Atolls. See attached maps. Education and outreach activities may include snorkeling in these and shallower areas.

9. Purpose/Need/Scope:

State purpose of proposed research and list hypotheses to be tested.

The purpose of the proposed research is to add to existing multibeam coverage of these atolls, with the eventual goal of obtaining complete coverage at all depths between the surface and 200 m with both bathymetry and backscatter imagery.

Describe how your proposed project will help provide information or resources to fulfill the National Wildlife Refuge purpose and to reach the Refuge goals and objectives.

The proposed work will assist in providing complete mapping coverage of Kure and Pearl and hermes Atolls, which will be useful in future research and management efforts.

Describe context of this research include history of the science for these questions and background of the research.

This mapping is called for in the Pacific Island Moderate Depth Habitat Mapping Implementation Plan, which was released in 2003 following extensive input from relevant management agencies, and is a continuation of mapping that has occurred since that year.

Explain the need for this research and how it will help to enhance survival or recovery of refuge wildlife and habitats.

Benthic habitat maps are basic tools required for effective management of marine ecosystems. The proposed research will enhance the survival and recovery of refuge marine habitats and fauna by helping to provide these tools.

Describe how your proposed project can help to better manage the National Wildlife Refuge or global communities.

The proposed work will assist in providing complete mapping coverage of Pearl and Hermes Atoll, and will support future research and management efforts by providing high-resolution map products.

10. Procedures (include equipment/materials) ☐ (graduate proposals attached)

Surveying will be accomplished using 3 different multibeam systems, including a Simrad EM300 and EM3002 aboard the NOAA Ship Hi'ilakai, and a Reson 8101 system aboard the survey launch R/V Ahi. The Ahi will survey in shallow waters during the day while the ship will survey deeper areas at all hours.

11. Funding sources (attach copies of all funding documentation including proposals submitted to funding sources).

Funding for this mapping is provided by the NOAA Coral reef Conservation Program to the NOAA Pacific Island Fisheries Science Center. See attached funding information.

12. List all literature cited in this application as well as all other publications relevant to the proposed project.

Miller and Rohmann, 2003. Mapping Moderate Depth Habitats of the U.S. Pacific Islands with Emphasis on the Northwestern Hawaiian Islands: An Implementation Plan. ftp://ftp.soest.hawaii.edu/pibhmc/web/docs_March2006/Pacific_mod_depth_MIP.pdf

13. What types of insurance do you have in place? (attach documentation) NOAA Ship HI'IALAKAI is a U.S. Government-owned and -operated research vessel and is self-insured by the U.S. Government.

☐ Grounding (required for vessels only)

☐ Contaminants Spills (required for vessels only)

☐ Medical Evacuation

14. What certifications/inspections do you have scheduled for your vessel? (attach documentation)

XX Rat free Scheduled for the Hi'ialakai's next inport period, April 10-17, 2006.

☐ Hull inspection

15. Other permits (list and attach documentation of all other required Federal or State permits).

See attached.

16. Project's relationship to other research projects within the same National Wildlife Refuge, the same National Wildlife Refuge Complex, or elsewhere.

A 60 m bathymetric grid from this mapping effort will be publicly available for download at http://www.soest.hawaii.edu/pibhmc/pibhmc_nwhi.htm within 6 months following collection. Backscatter and higher-resolution bathymetry will be made available upon request after processing is complete, normally within 2 years following collection. These data are of use to many research projects being conducted in the NWHI.

Section C: Logistics

17. Time Frame:	
Project Start Date 6/23/2006	Project Completion Date 7/19/2006

Dates actively inside the National Wildlife Refuge(s).

We are tentatively scheduled to be at Pearl and Hermes Atoll between 07/06/2006 and 07/14/2006. It is possible that we will be within NWR waters during daylight hours on any day during that period. It is not unlikely that our dates may slip one or two days in either direction also. Education and outreach personnel may dive or snorkel, and mapping may take place, within Refuge waters at any time during this period.

Personnel schedule in the National Wildlife Refuge(s) (describe who will be where and when).

We are tentatively scheduled to be at Pearl and Hermes Atoll between 07/06/2006 and 07/14/2006. It is possible that we will be within NWR waters during daylight hours on any day during that period. It is not unlikely that our dates may slip one or two days in either direction also. Education and outreach personnel may dive or snorkel, and mapping may take place, within Refuge waters at any time during this period.

18. Gear and Materials

Mapping will be conducted using hull-mounted multibeam sonar systems. No equipment will touch the seafloor. Education and outreach activities will include snorkeling and scuba diving equipment from a small boat. If the boat anchors, care will be taken to avoid damaging coral or other sensitive areas.

19. Permanent or semi-permanent installations and instrumentation.

None

20. Request for volunteer maintenance of installations or collection of data and/or samples.

None

21. Transportation:

How will personnel be transported to and from the National Wildlife Refuge(s)?

Transportation to and from the refuge will be provided by the NOAA Ship Hi'ialakai.

How will gear and materials be transported to and from the National Wildlife Refuge(s)?

Transportation to and from the refuge will be provided by the NOAA Ship Hi'ialakai.

If transported by ship, how will personnel, gear and materials be transported between ship and shore?

There are currently no plans for personnel or materials to be transported ashore. However, in the event that that need arises, transport will be provided by one of the ship's small boats.

If applicable, how will personnel be transported between islands within any one atoll?

Personnel will be transported within the atoll by one of the ship's small boats.

How will personnel access species and habitat at the atoll (walking, climbing, wading, swimming, snorkeling, diving, etc.).

Direct access to species and habitat will be afforded to education and outreach personnel via snorkeling and scuba diving. Personnel engaged in mapping will only have remote access via multibeam sonars.

How will samples be transported off the island?

No sampling will be conducted.

Provide a time line of all significant transportation events.

We are tentatively scheduled to arrive at Pearl and Hermes Atoll on 07/06/2006. Any transportation within NWR waters would take place on any or all days between that date and 07/14/2006, when we are scheduled to head to the main Hawaiian Islands.

22. Provide a time table for sample analysis, data analysis, write-up and publication of information.

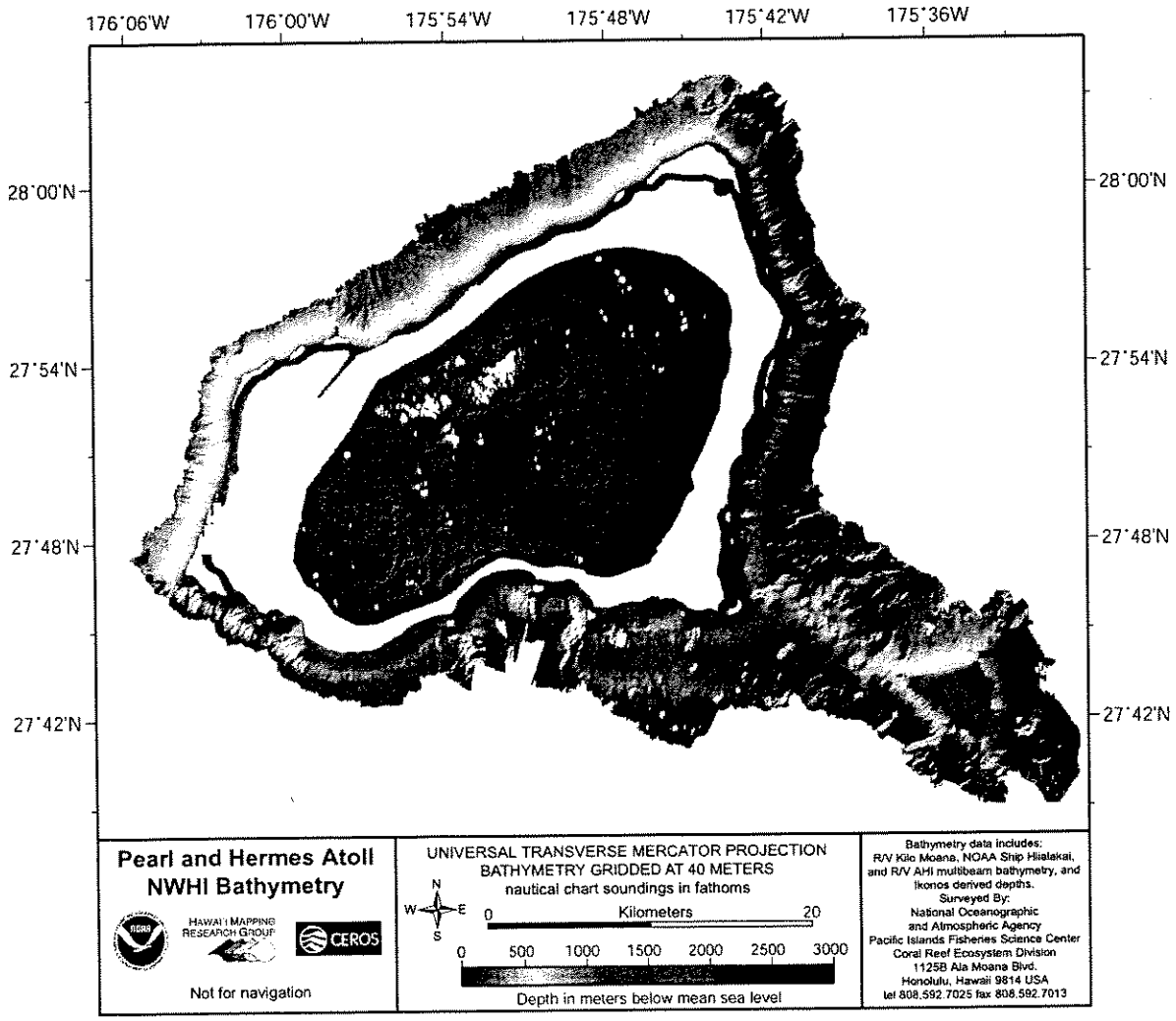
Bathymetric data will be processed and made publicly available on our website within 6 months following the cruise. Acoustic backscatter imagery will be available within 2 years following the cruise.

23. Hazardous Materials

NOAA Ship Hi'ialakai carries up to 228,642 U.S. gallons of diesel fuel. Other fuel/chemicals to be carried on board and amounts: gasoline – as much as 700 U.S. gal.; lube oil – as much as 10,442 U.S. gal.; numerous other industrial and household chemicals used to operate a 224-foot research vessel

24. Storage Space All required storage, living, and work space required for all personnel associated with the proposed work will be provided the NOAA Ship Hi'ialakai.
25. Living Space All required storage, living, and work space required for all personnel associated with the proposed work will be provided the NOAA Ship Hi'ialakai.
26. Work Space All required storage, living, and work space required for all personnel associated with the proposed work will be provided the NOAA Ship Hi'ialakai.

NOTE: INCOMPLETE APPLICATIONS WILL NOT BE ACCEPTED


176°06'W
176°00'W
175°54'W
175°48'W
175°42'W
175°36W
28°00'N
27°54'N
27°48'N
27°42'N
Pearl and Hermes Atoll
NWHI Bathymetry
HAWAI'I MAPPING RESEARCH GROUP
CEROS
Not for navigation
UNIVERSAL TRANSVERSE MERCATOR PROJECTION
BATHYMETRY GRIDDED AT 40 METERS
nautical chart soundings in fathoms
N
W
E
S
0
Kilometers
20
0
500
1000
1500
2000
2500
3000
Depth in meters below mean sea level
Bathymetry data includes:
R/V Kilo Moana, NOAA Ship Hiialakai,
and R/V AHI multibeam bathymetry, and
Ikonos derived depths.
Surveyed By:
National Oceanographic
and Atmospheric Agency
Pacific Islands Fisheries Science Center
Coral Reef Ecosystem Division
1125B Ala Moana Blvd.
Honolulu, Hawaii 9814 USA
tel 808.592.7025 fax 808.592.7013

NOAA Coral Reef Conservation Program - Internal

FY 2006 2033

Benthic Habitat Mapping and Characterization - Northwestern and Main Hawaiian Islands

BUDGET: CRCP EXPENDITURES

NOAA Coral Reef Conservation Program Expenditure Summary Report:

Expenditure Type:	Type Other Specified:	Organization Type:	Organization Name:	Amount:	Details:
Federal Travel				$5,053.00	
Contract Travel				$9,588.00	
Other	shipping, postage, binding, publication, forms, aircraft charters			$19,176.00	
Equipment				$53,692.00	
Non-Labor Contracts				$84,504.00	
Contract Labor		Academia	University of Hawaii	$400,000.00	
Federal Labor				$65,594.00	
Supplies				$52,733.00	

This project is scheduled to occur on a cruise aboard the NOAA Ship *Hi'ialakai*, from June 23 through July 19, 2006. Funding for this work is provided to the NOAA Pacific Island fisheries Science Center (PIFSC), Coral Reef Ecosystem Division (CRED), under the direction of Dr. Russell Brainard, by the NOAA Coral Reef Conservation Program.

Thank you for your assistance with this request.

Aloha,

John J. B. Rooney
Coastal Geomorphologist
NOAA Fisheries' Coral Reef Ecosystem Division

Project summary:

Background: Benthic habitat maps are routinely cited as essential tools for effective management of coral reef ecosystems. The recent grounding of the *M/V Casitas* at Pearl and Hermes Atoll is but one of many examples in which the ability to respond quickly and appropriately to a management is enhanced by the ready availability of high-resolution data. Many research projects or management endeavors in the Northwestern Hawaiian Islands are hampered by incomplete, inaccurate, or poorly detailed map coverage. The proposed work will help to address that need by making significant contributions to the existing database of high-resolution multibeam bathymetry and backscatter imagery in state and federal waters around both Pearl and Hermes and Kure Atolls. Focusing primarily on depths between 20 m and 200m, this work will utilize the Simrad EM3002 and EM300 multibeam systems installed aboard the NOAA ship *Hi'ialakai* for around-the-clock surveying. A Reson 8108 system installed on the 8 m survey launch *R/V AHI* will be used for surveying in shallower waters closer to shore during daylight hours. We estimate that of the remaining seafloor between depths of 20 m and 200 m that has yet to be surveyed with multibeam technology, approximately 80% of it at Kure Atoll, and 50% at Pearl and Hermes Atoll will be completed with the proposed work.

Technical Information:

Objectives:

1. Collect multibeam data over approximately 50% of the remaining unsurvey areas between the 20 m and 200 m isobaths at Pearl and Hermes Atoll. Exact areas of collection will depend on sea conditions, sonar performance, and logistical considerations.
2. Collect multibeam data over approximately 80% of the remaining unsurvey areas between the 20 m and 200 m isobaths at Kure Atoll. Exact areas of collection will depend on sea conditions, sonar performance, and logistical considerations.
3. Complete initial (swath) editing of all multibeam bathymetric data collected at Pearl and Hermes Atoll.
4. Complete initial (swath) editing of all multibeam bathymetric data collected at Kure Atoll.

Hypothesis to be Tested: NA

Project Significance: Worldwide concern over the degradation of coral reef ecosystems is prompting researchers to better understand and monitor changes in these systems over time. However, in the Northwestern Hawaiian Islands, many research projects or management endeavors are hampered by incomplete, inaccurate, or poorly detailed map coverage. The proposed work will help to address that need by making significant contributions to the existing database of high-resolution multibeam bathymetry and backscatter imagery in state and federal waters around both Pearl and Hermes and Kure Atolls. Focusing primarily on

depths between 20 m and 200m, this work will utilize the Simrad EM3002 and EM300 multibeam systems installed aboard the NOAA ship *Hi'ialakai* for around-the-clock surveying. A Reson 8108 system installed on the 8 m survey launch *R/V AHI* will be used for surveying in shallower waters closer to shore during daylight hours. We estimate that of the remaining seafloor between depths of 20 m and 200 m that has yet to be surveyed with multibeam technology, approximately 80% of it at Kure Atoll, and 50% at Pearl and Hermes Atoll will be completed with the proposed work.

Methods: Multibeam surveying of moderate depth (20 m - 200 m) in both state and federal waters around Pearl and Hermes and Kure Atolls are proposed for cruise HI0609 on NOAA sip *Hi'ialakai* for the period between June 23 and July 19, 2006. The collection and processing of these data will follow procedures documented at http://www.soest.hawaii.edu/pibhmc/pibhmc_documentation.htm. As mentioned above, three different multibeam systems will be used. Characteristics of these systems are tabulated below:

Multibeam System	Manufacturer	Platform	Operating Frequency	Number of Beams	Approx. Max. Depth Range
EM3002	Simrad	*Hi'ialakai*	300 kHz	300-500	150 m
EM300	Simrad	*Hi'ialakai*	30 kHz	135	3000 m
8108	Reson	*R/V AHI*	240 kHz	101	250 m

Surveying will be conducted 24 hours per day onboard the *Hi'ialakai*, except for brief intermissions to launch or recover small boats or conduct other operations as required. Surveying will be conducted aboard the *R/V AHI* during periods of daylight only, typically between the hours of 0800 and 1630. Two mapping personnel will operate the *R/V AHI.* Aboard the *Hi'ialakai*, rotating teams of 2-4 scientists will stand 12 hour watches, with their first 8 hours on dedicated to data collection and their last 4 hours of watch primarily spent swath editing bathymetric data. Processing of acoustic backscatter imagery in generally accomplished during in port periods.

Results of this work will include bathymetric grids and backscatter imagery. Bathymetric grids will be produced at a resolution of 5 m and 60 m. The latter will be made publicly-available for download from the Pacific Island Benthic Habitat Mapping Center website (http://www.soest.hawaii.edu/pibhmc/pibhmc_nwhi.htm) within 6 months following completion of the cruise. High-resolution (5 m) bathymetric data will be provided to the NWHICRER GIS Specialist as soon as processing is complete. Due to the large file sizes, high resolution grids will not normally be available via the website, but available upon request.

Processing of acoustic backscatter imagery is more difficult and time-consuming. However, processed imagery is also publicly available from the above website, but typically is not completed for up to two years following data collection.

Personnel: Dr. John J. Rooney, project supervisor, is a Coastal Geomorphologist with the NOAA Pacific Island Fisheries Science Center. He is experienced with all phases of multibeam data collection and has served as Chief Scientist on previous mapping cruises.

Vessel requirements: Surveys will be conducted from the NOAA ship *Hi`ialakai* and CRED's survey launch *R/V AHI,* which will be launched and recovered by the *Hi'ialakai* daily. The ship has a 4,000 U.S. gal Collection Holding Tank for sewage and grey water. In those waters where effluent may NOT be discharged, sewage and grey water are held in this tank until the ship is in waters where sewage and grey water may be discharged. The ship has a U.S. Coast Guard-approved Marine Sanitation Device (Omnipure model MSD 12 MC) which is used to treat sewage and grey water in those waters where effluent may be discharged. The *R/V AHI* has a portable toilet which is emptied into the *Hi'ialakai's* holding tank after each day of operation.

References:

Miller and Rohmann, 2003. *Mapping Moderate Depth Habitats of the U.S. Pacific Islands with Emphasis on the Northwestern Hawaiian Islands: An Implementation Plan.* ftp://ftp.soest.hawaii.edu/pibhmc/web/docs_March2006/Pacific_mod_depth_MIP.pdf

Environmental consequences: Multibeam surveying is not a prohibited activity, and it must be conducted within reserve boundaries if high-resolution maps of those areas are to be produced.

Treatment of results: Results of this work will include bathymetric grids and backscatter imagery. Bathymetric grids will be produced at a resolution of 5 m and 60 m. The latter will be made publicly-available for download from the Pacific Island Benthic Habitat Mapping Center website (http://www.soest.hawaii.edu/pibhmc/pibhmc_nwhi.htm) within 6 months following completion of the cruise. High-resolution (5 m) bathymetric data will be provided to the NWHICRER GIS Specialist as soon as processing is complete. Due to the large file sizes, high resolution grids will not normally be available via the website, but available upon request.

Processing of acoustic backscatter imagery is more difficult and time-consuming. However, processed imagery is also publicly available from the above website, but typically is not completed for up to two years following data collection.

Supporting information:

Financial support: Support for the collection and processing of multibeam data are provided by the NOAA Coral Reef Conservation Program. Salary support for scientific personnel on the cruise is provided by each individual's home agency. In most cases, these personnel are provided by PIFSC/CRED. Susan Vogt of the NOAA national Marine

Sanctuary Program (NOAA-NMSP) is expected to also participate, as will Akel Sterling of the University of Hawaii's Hawaii Mapping Research Group UH-HMRG). We are actively seeking an additional two scientists from partner agencies and would welcome and appreciate assistance in this regard from the NWHICRER. Training will be provided as necessary for personnel without multibeam experience.

Coordination with Research in Progress: Priorities of the various state and federal management and stakeholder agencies for mapping in the Northwestern Hawaiian Islands were compiled and documented in *Mapping Moderate Depth Habitats of the U.S. Pacific Islands with Emphasis on the Northwestern Hawaiian Islands: An Implementation Plan* (Miller and Rohmann, 2003). This document is used as a guide in planning mapping efforts. Additionally, we routinely canvas the NWHICRER, USFWS, and Hawaii DLNR for new priorities and modifications to the plan. All of the processed data from the NWHI we have collected since the multibeam systems described above became available have been provided to the NMSP GIS Specialist.

Copies of Other Permits: See attached copies of permit applications to the Hawaii DLNR and USFWS.